

scheduling the defined task objects of said identified task space so that each task object ready for processing is processed by a next available "unoccupied" one of the plurality of processors, by the sequence of: (i) placing a task object with an unfilled "data-waiting" slot in a "waiting" state ...; (ii) changing the status of a task object to an "active" state when all of its defined "data-waiting" slots have been filled, wherein it is assigned to a next available processor in an "unoccupied" state, then placing that processor's status in an "occupied" state; and (iii) changing the status of the task object to a "dead" state when the computational step to be performed for the task object by the assigned processor has been completed, and then changing the processor's status to an "unoccupied" state to be assigned to a next "active" task object.

The Rentschler patent discloses a CG system having a number (3 or 4) of "geometry accelerator" processors in parallel which proceed in the following sequence:

(1) The front end (rendering) board 10 has a distributor 30 and 3D geometry accelerators 32A, 32B, and 32C, a 2D geometry accelerator 34, and a concentrator 36. The distributor receives the X,Y,Z coordinate and color primitive data from the host computer, and distributes the data evenly among the 3D geometry accelerators 32A, 32B, and 32C to operate on them simultaneously (col. 4, lines 14-24).

(2) Each 3D geometry accelerator transforms the X,Y,Z coordinates into screen space coordinates, determines object R,G,B color values and texture S,T values for the screen space coordinates, decomposes quadrilaterals into triangles, calculates partial slope information, performs lighting calculations, and computes a triangle plane equation to define each triangle, as well as view clipping operations (col. 4, lines 30-39). In other words, the Rentschler distributor divides the polygon rendering tasks for a scene evenly among the 3 or 4 parallel processors, and each parallel processor performs the entire sequence of computations for the assigned rendering task in pipeline fashion.

(3) Each geometry accelerator includes two separate processors in "stacks" in a

pipeline configuration. A left stack 110 is controlled by a left stack control unit 122 which includes address decode logic, a transformation engine and a decomposition engine. Results from the left stack 110 are supplied to a right stack 130 which includes a color clamer/comparator, a register file, a multiplexer, a floating point ALU, a floating point multiplier, and a floating point divide/square root unit. Operations of the right stack are controlled by a right stack control unit 152, which includes lighting, clipping, and plane equation engines. A handshaking control unit 156 couples the two stacks to work together. Results from the right stack 130 are supplied to an output FIFO 150. (Col. 6, lines 17-47)

(4) The outputs of the geometry accelerator are provided to the concentrator 36 which combines the computed 3D primitives output data and reorders them into their original order before distribution by the distributor in accordance with their "end of chunk" bits. The properly ordered, 3D primitives data are then sent to the external texture mapping board 12 and to the frame buffer board 14 for rendering the complete scene. (Col. 4, lines 43-54).

As is apparent from the above description, the Rentschler CG system appears to be a form of pipelining by distributing rendering tasks among a small number (2) of parallel processors. Each parallel processor performs the entire sequence of sub-calculation steps to render each vertex rendering task it is assigned, then the computed tasks are put back in their original order to render the final scene. The Rentschler patent does not mention or suggest assigning "active tasks" to the next available one of a large number of available parallel processors in an "unoccupied" state. It does not place a task object with an unfilled "data-waiting" slot in a "waiting" state in which it is not assigned to any processor. It does not change the status of a task object to an "active" state when all of its defined "data-waiting" slots have been filled. It does not assign the "active" task object to a next available processor in an "unoccupied" state, then place that processor's status in an "occupied" state. It does not switch the processor back to "unoccupied" state when it is finished its processing task.

Therefore, the Rentschler patent does not appear to be any more relevant to the POTS Engine invention than the previously cited references. To make these differences even more clear, the main Claims are amended to define that each task object ready for processing is

processed by a next available “unoccupied” one of the plurality of processors. The claims now clearly define over the Rentschler assignment of a string of rendering tasks to be completed by one of two pipeline processors by reciting that self-contained computational subtasks are assigned to a next available one of a plurality of parallel processors flagged as being in an “unoccupied” state.

The amendments submitted in response to the final Office Action are submitted only to clarify the Applicant’s position previously presented and argued to the Examiner, and do not raise “new issues requiring further examination or consideration”. Therefore, entry of these amendments and allowance of Claims 1-20 are respectfully requested upon reconsideration.

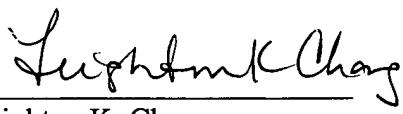
No fee is deemed to be due for this amendment. However, if any fees are determined to be due for acceptance of this amendment, authorization is hereby given to charge our Deposit Account No. 502633 of the undersigned firm.

This response is filed with a certificate of mailing within two months of the date of mailing of the action. Any time extension required for response to a further advisory action is to be measured from the date of mailing of the advisory action.

CERTIFICATE OF MAILING:

The undersigned certifies that the foregoing is being mailed on February 17, 2005, by depositing it with the U.S. Postal Service, first class postage paid, addressed to: Mail Stop: AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Respectfully submitted,
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